

Appl. No. 07/702,615
Response filed on October 3, 2002

first and second resilient, electrically conductive support arms, connected electrically in parallel, arranged for being axially spaced from each other with respect to a longitudinal axis of said DC electric motor when said assembly is mounted in the motor, third and fourth resilient, electrically conductive support arms, connected electrically in parallel, arranged for being axially spaced from each other with respect to a longitudinal axis of said DC electric motor when said assembly is mounted in the motor,

each of said support arms carrying a respective carbon brush body, said carbon brush bodies being arranged for contacting a generally cylindrical commutator of the motor, each of said brush bodies being mounted by an interference fit in an aperture in a respective support arm,

the commutator having a plurality of circumferential segments and the first and second brush bodies being capable of contacting a single one of said segments simultaneously and the third and fourth brushes assembly being capable of contacting a single one of said segments simultaneously when the assembly is mounted in the motor,

an end cap, said support arms being mounted on said end cap, said brush bodies being mounted on said end cap via said support arms for contacting a commutator of the motor,

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each support arm in combination with a respective brush body having a different respective natural resonance frequency of oscillation,

wherein said support arms have portions made of different resilient materials, thereby providing said different natural resonance frequencies,

wherein said brush bodies having different resonance frequencies remain in reliable electrical contact with said commutator in order to reduce interface resistance between the brush bodies and the commutator, despite oscillations of said support arms and brush bodies which occur in response to rotation of said commutator.

95. An electric motor brush assembly for being mounted in a DC electric motor, comprising:

first and second resilient, electrically conductive support arms, connected electrically in parallel, arranged for being axially spaced from each other with respect to a longitudinal axis of said DC electric motor when said assembly is mounted in the motor, third and fourth resilient, electrically conductive support arms, connected electrically in parallel, arranged for being axially spaced from each other with respect to a longitudinal axis

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of said DC electric motor when said assembly is mounted in the motor,

each of said support arms carrying a respective carbon brush body, said carbon brush bodies being arranged for contacting a generally cylindrical commutator of the motor, each of said brush bodies being mounted by an interference fit in an aperture in a respective support arm,

the commutator having a plurality of circumferential segments and the first and second brush bodies being capable of contacting a single one of said segments simultaneously and the third and fourth brushes assembly being capable of contacting a single one of said segments simultaneously when the assembly is mounted in the motor,

an end cap, said support arms being mounted on said end cap, said brush bodies being mounted on said end cap via said support arms for contacting a commutator of the motor,

each support arm in combination with a respective brush body having a different respective natural resonance frequency of oscillation,

wherein said support arms have portions made of different resilient materials, thereby providing said different natural resonance frequencies,

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wherein said brush bodies having different resonance frequencies remain in reliable electrical contact with said commutator in order to reduce interface resistance between the brush bodies and the commutator, despite oscillations of said support arms and brush bodies which occur in response to rotation of said commutator.--